

Workstations and MicroVAX 2000 Network Guide

Order Number EK-NETAC-UG-003

September 1988

**digital equipment corporation
maynard, massachusetts**

December 1986
October 1987
June 1988
September 1988

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Preface

This manual describes how to configure and install some simple ThinWire Ethernet networks for the VAXstation 2000 and MicroVAX 2000 systems. It does not describe all possible configurations, but outlines the rules to follow when configuring your network with ThinWire Ethernet.

Recommended Reading Path

1. *VAXstation 2000 System Guide* or *MicroVAX 2000 Hardware Installation Guide*. You should install your VAXstation 2000 before installing standard or ThinWire Ethernet.
2. *Workstations and MicroVAX 2000 Network Guide* (this guide), Chapter 1. This chapter introduces you to some of the hardware and software that form a network.
3. *Workstations and MicroVAX 2000 Network Guide*, Chapter 2. This chapter tells you how to configure simple ThinWire networks.
4. *Workstations and MicroVAX 2000 Network Guide*, Chapter 3. This chapter describes how to install ThinWire Ethernet hardware on your system.
5. *Workstations and MicroVAX 2000 Network Guide*, Chapter 4. This chapter describes how to set up your system to use standard Ethernet.

The glossary explains technical terms used in this guide.

Conventions

The following notices appear throughout this guide:

- **Notes**—Contain general or supplemental information about a topic.
- **Cautions**—Contain information to prevent disruption of the network.

Convention	Meaning
Bold	Notes and cautions are bolded.
<i>Italics</i>	Terms defined in the glossary are italicized the first time the word appears in the text.

Document Structure

This manual consists of four chapters and an appendix.

- Chapter 1 gives an overview of ThinWire Ethernet and standard Ethernet, defines networks, and describes DECnet, ULTRIX networks, and VAXclusters.
- Chapter 2 describes the basic components you will need, some simple configurations, and how to connect to ThinWire Ethernet.
- Chapter 3 describes how to determine your networking needs and how to install and troubleshoot a ThinWire Ethernet network.
- Chapter 4 describes how to install and verify a VAXstation 2000 or MicroVAX 2000 connected to standard Ethernet.
- The appendix lists associated documents that might be helpful in planning your network.

Chapter 1

Overview

This chapter introduces some basic networking concepts and describes the hardware and software that form a network.

Why Networks?

Networks are useful to people who need to work together and share information but still want the attractive features of their own VAXstation 2000 or MicroVAX 2000. People working cooperatively on a project may need to communicate and exchange information, share common data bases, share files, or use a mail system. DIGITAL networking lets them do this.

One advantage of a network for a user is that critical information, no matter where it is located, is available when needed.

From the perspective of an employer/organization, the advantage of a network is the efficient use of information and the cost-effective use of resources (sharing of software, disks, tapes, and printers).

The big benefit of a network lies in the increased effectiveness of a company's employees. Networks help employees make intelligent and timely decisions by giving them quick access to critical information.

What Makes a Network?

A network is a group of computers connected by communications lines to share information and resources. You need special network hardware and software to connect your network. DIGITAL hardware and DECnet software enable computers to form a network.

Ethernet Is the DIGITAL Local Area Network

Ethernet networks provide rapid access to data in remote locations. Ethernet provides the high data rate required by DIGITAL's DECnet software for file transfer. In baseband Ethernet (standard or ThinWire), a single network cable is used for communications.

- *Standard Ethernet* cable is recommended for communications between floors and buildings.
- *ThinWire Ethernet* cable is recommended for communications between the desktop and other systems in local areas on a floor.

Standard Ethernet

Standard Ethernet cable is used to connect wiring centers and computer facilities, floors of buildings, and stand-alone ThinWire networks. Standard Ethernet cable is of rugged construction; it is immune to external factors that might otherwise limit high-speed 10M bits/s data communications.

ThinWire Ethernet

ThinWire Ethernet is a network cabling system that delivers 10M bits/s Ethernet to the desk, the work area, and the local area system for connection of personal computers, workstations, and other network products. All DIGITAL Ethernet products can connect to ThinWire cable.

ThinWire cable can be used in any size environment. It is flexible, fully compatible with standard Ethernet, and inexpensive. ThinWire works well as a small- to medium-sized stand-alone local area network (LAN) in a small business or in a department of a larger organization where personal computer and workstation users need local resource sharing and more powerful computing resources. A LAN is a high-speed communications network that covers a limited geographical area, such as a section of a building, an entire building, or a cluster of buildings.

Unshielded Twisted-Pair Ethernet

Unshielded twisted-pair building cable can be used with ThinWire cable to run Ethernet to the desktop. A small stand-alone local area network, where a VAXstation 2000 or a MicroVAX 2000 user shares a limited local resource like a printer, can be connected using unshielded twisted-pair building cable and ThinWire cable.

A pair of unshielded twisted-pair Ethernet adapters is used to deliver the 10M bits/s Ethernet performance to the desktop, work area, and local system. Functionally, an office adapter and a wiring closet/SER (Satellite Equipment Room) adapter work as a pair to match the 50-ohm impedance on the ThinWire cable to the impedance on the unshielded twisted-pair cable. Unshielded twisted-pair adapters connect a single device, a MicroVAX 2000, or a VAXstation 2000 to the Ethernet network by means of the DIGITAL ThinWire Ethernet *Multipoint Repeater (DEMPR)* or the DIGITAL ThinWire Ethernet *Single Port Repeater (DUSPR)*.

Unshielded twisted-pair Ethernet adapters are compatible with the ThinWire Ethernet products and IEEE 802.3 specifications.

The maximum length of 24 AWG (American Wire Gauge) unshielded twisted-pair cable that can be used between the office adapter and the wiring closet adapter is 70 m (230 ft).

DECnet

DECnet, a software product that enables many DIGITAL computer systems to form a network, is derived from a well-defined network architecture called the DIGITAL Network Architecture (DNA). DNA is similar to the International Organization for Standardization (ISO) standards for communications architecture and is the logical structure that provides a model for DECnet implementations. DECnet provides:

- Task-to-task communications—let programs executing in different systems exchange information.
- File transfer—supports the copying of files among different systems.
- Remote file access—lets the user read, write, delete, or modify files on another system.
- Remote command file submission and execution—lets one computer system direct another system to execute commands and/or perform tasks.
- Down-line loading—lets programs developed on a system with appropriate peripherals and resources be sent to another system, such as a small, memory-only system, for execution.
- The network virtual terminal—gives a user connection to a remote system; the terminal operates as if it were connected to the remote system.
- Network management—provides for monitoring and controlling network operation in a distributed environment.

Networking Capabilities of ULTRIX

Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocols are standard with the ULTRIX-32 operating system software. They are an integral part of the operating system and facilitate interaction with Internet networks. Support includes file transfer, remote execution, remote login, and resource-sharing capabilities with other systems running the TCP/IP protocols.

DECnet-ULTRIX provides an Ethernet-based communication link between VMS and ULTRIX operating systems. ULTRIX bridges both environments by supporting the coexistence of the DECnet and TCP/IP protocols. DECnet and TCP/IP can run simultaneously and share the same system resources, such as the DEUNA and DEQNA Ethernet interfaces. This feature lets a DECnet-ULTRIX system act as an informal gateway between DECnet networks and Internet networks. DECnet-ULTRIX lets ULTRIX interact with other DIGITAL and non-DIGITAL operating systems using DECnet products, such as DECnet-RSX, DECnet-VAX, and DECnet-DOS.

Local Area VAXclusters (LAVc)

The computer industry today provides individuals or small work groups in organizations with their own personal computer systems or workstations, solving the computing availability problem but creating a new set of problems—managing large numbers of geographically dispersed personal workstations. Users may inherit system management responsibilities when they need more knowledge of the operating system to perform system management tasks.

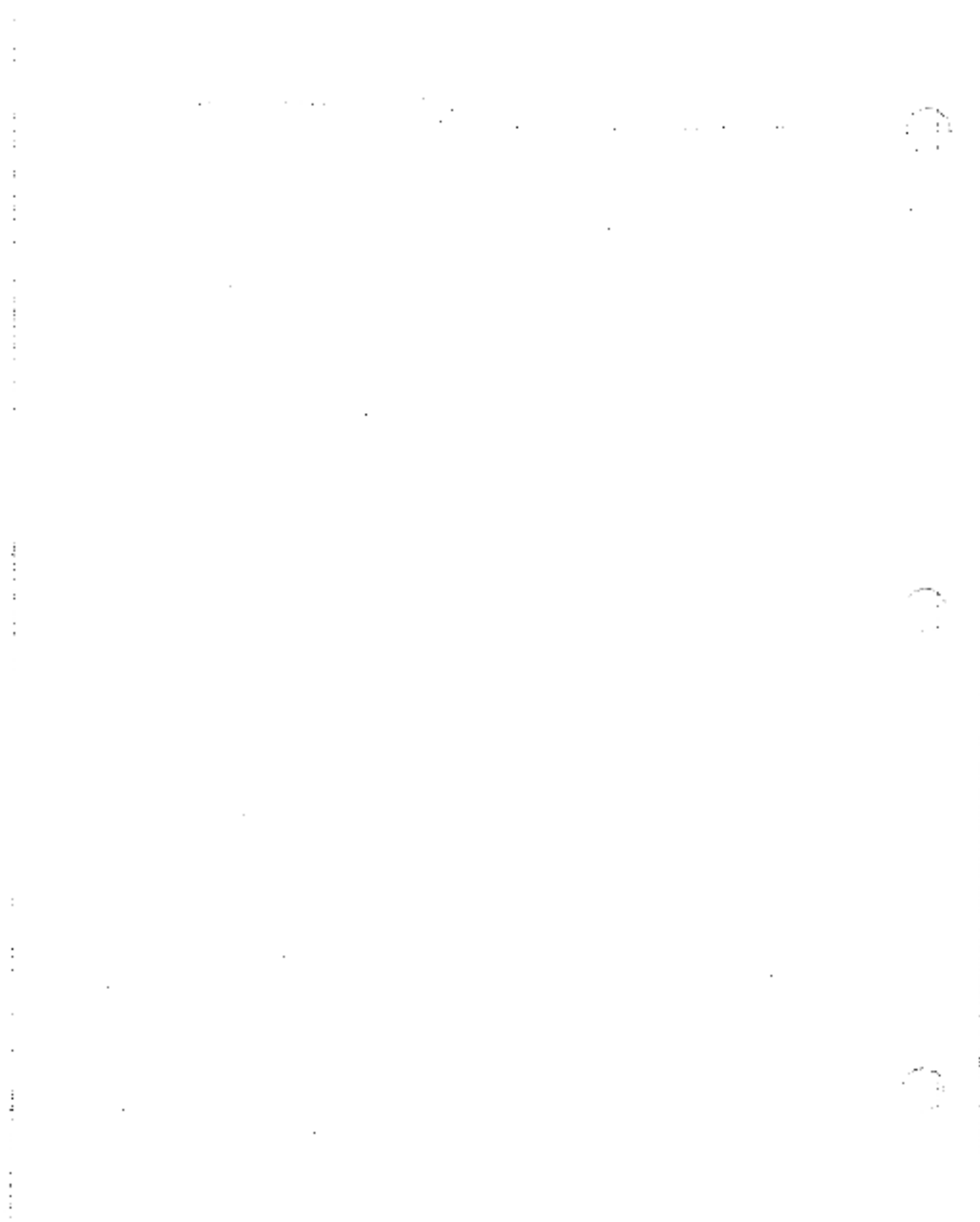
The Local Area VAXcluster, using ThinWire or standard Ethernet as the interconnect, lets DIGITAL's VAXstation and MicroVAX products be grouped in similar VMS work groups, removing system management on a per node basis and elevating it to a single system management domain. Except for the interconnect-dependent driver software, the same VAXcluster software is used on both CI-based clusters and ThinWire or standard Ethernet-based clusters. A CI (Computer Interconnect)-based cluster uses a star coupler as the common connection point for all cluster nodes.

The Local Area VAXcluster system increases disk space and data sharing among members of a group or team. VAXclusters provide distributed processing capabilities to allow for load-sharing, batch and print processing across member nodes or to target a node, reducing the amount of underutilized computes.

Usually, the VMS operating system is installed on every MicroVAX or VAXstation system. In a Local Area VAXcluster, a system needs no local software installation. A system can be plugged into a suitable ThinWire or standard Ethernet connection and be remotely booted, removing the need for local software installation. The MicroVAX 2000 (RD54 disk-based systems) can serve as the LAVc boot node for three workstations.

The VMS operating system software allows membership in a Local Area VAXcluster. The software provides flexibility by letting many Local Area

VAXclusters share the same Ethernet or ThinWire Ethernet segment and by letting nodes logically move from one cluster to another.



Chapter 2

Setting Up the Network

This chapter describes some of the basic components used in setting up a network. The chapter includes some simple topologies and lists the rules for configuring a network, using ThinWire Ethernet. Later chapters tell you how to install ThinWire hardware and how to connect to standard Ethernet.

Basic ThinWire Components

An Ethernet module contains a *transceiver* that lets you connect your system to ThinWire Ethernet. The Ethernet module is preinstalled in all VAXstation 2000 systems. If you want to connect a MicroVAX 2000 system to ThinWire Ethernet, order the Ethernet module preinstalled or contact field service to install the module.

An Ethernet module consists of the following:

- One Ethernet module
- Two *terminators*
- One *T-connector*

To order ThinWire cable lengths with *connectors* at each end, contact your DIGITAL representative.

If you prefer, you can purchase ThinWire Ethernet cable on a spool and cut the cable to your needs. See the *VAXstation 2000/MicroVAX 2000 Maintenance Guide* for information on cutting and crimping ThinWire Ethernet cable.

Before reading about configurations, you need to know the following terms.

- *Station*—A single addressable device on a Local Area Network; for example, a VAXstation 2000 or a MicroVAX 2000.
- *Section*—A single continuous piece of *coaxial cable*.
- *Segment*—Any number of ThinWire sections joined by *barrel connectors* or *T-connectors* to form a single, continuous cable.

ThinWire Ethernet Cable

ThinWire Ethernet cable has a jacket of either *polyvinyl chloride (PVC)* or *teflon*. Either PVC or teflon cable can be used in an open office area. However, in the United States, teflon may be required for areas classified by the Underwriter's Laboratory (UL) as environmental air spaces, such as in air-conditioning ducts or air *plenums*. An air plenum is a compartment or chamber to which one or more compartments are connected in a building ventilation system and is used for carrying environmental air. Check your local building codes for more information.

The maximum length of a segment is 185 m (606 ft).

ThinWire Ethernet products adhere to the IEEE 802.3 standard and are compatible with products that conform to this international standard. ThinWire Ethernet cable gives high performance and is:

- Flexible
- Fully compatible with standard Ethernet
- Inexpensive

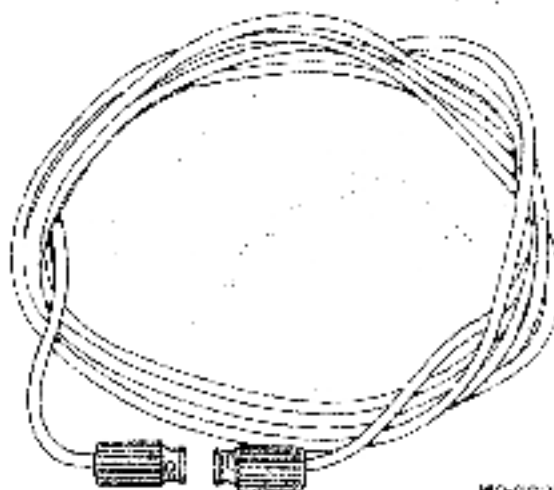
You can order ThinWire Ethernet cables in the following cable lengths.

Table 2-1: Ordering Information for ThinWire Ethernet Cables

Order No.	Description
BC16M-06	ThinWire Cable, PVC, 6'
BC16M-15	ThinWire Cable, PVC, 15'
BC16M-30	ThinWire Cable, PVC, 30'
H8243-A	ThinWire Cable, PVC, 1000' spool
H8244-A	ThinWire Plenum Cable, Teflon, 1000' spool

Figure 2-1 shows the ThinWire Ethernet cable.

Figure 2-1: ThinWire Ethernet Cable



MS-000-01

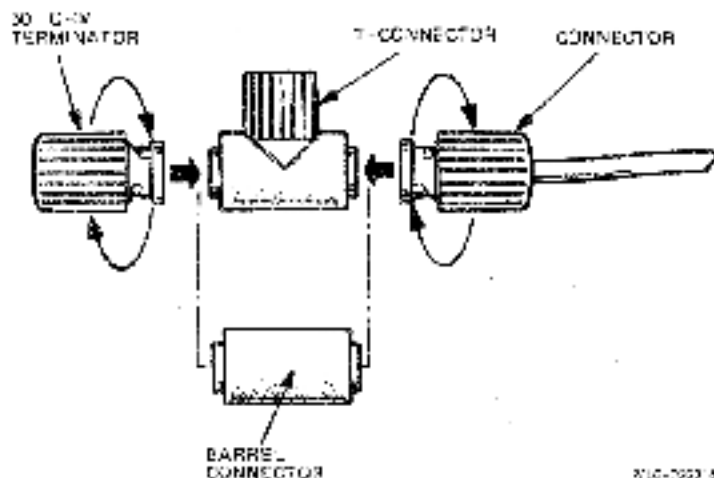
Connectors and Terminators

You need the following ThinWire connectors and terminators to configure your network:

- T-connector (H8223)—A 3-way connector that joins two ThinWire Ethernet cable sections. The third opening provides a network connection point for a VAXstation 2000 or a MicroVAX 2000 system.
- Terminator (H8225)—A connector at the end of a ThinWire segment that provides the 50-ohm termination resistance needed for the cable. If the ThinWire cable connects to a DIGITAL ThinWire Ethernet Multiport Repeater (DEMFR) or a DIGITAL Ethernet Single Port Repeater (DESFR), then a terminator is needed only at one end of the cable.
- Barrel connector (H8224)—A female connector that connects two ThinWire Ethernet cable sections.

Figure 2-2 shows the connectors you need to connect to ThinWire Ethernet.

Figure 2-2: Connectors



Additional Equipment

Use the following equipment for additional configurations:

- DIGITAL ThinWire Ethernet Multiport Repeater (DEMPR)
- DIGITAL ThinWire Ethernet Single Port Repeater (DESPR)
- DIGITAL ThinWire Ethernet Station Adapter (DESTA)
- Ethernet Bridge—LAN Bridge 100 (DEBET-AA, local bridge)
- Unshielded Twisted-Pair Ethernet Adapters

DIGITAL ThinWire Ethernet Multiport Repeater (DEMPR)

A DEMPR is a repeater, a device used to extend the length, topology, or interconnection of the physical network medium beyond the limits imposed by a single segment. A DEMPR retimes, amplifies, and repeats all signals received from one segment and passes the signals to the other ThinWire segments, as well as to the standard Ethernet segment.

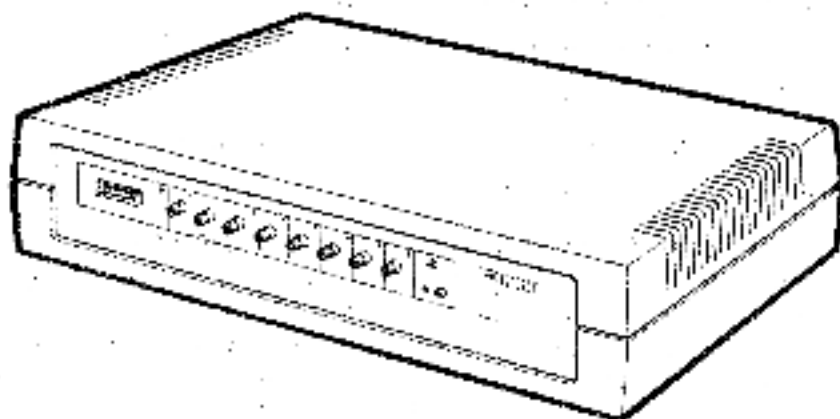
You can connect up to eight ThinWire Ethernet segments to a single DEMPR to form a single Local Area Network. Or, you can connect a ThinWire LAN to standard Ethernet through the DEMPR. Each segment can have 29 stations (the 30th position is taken by the DEMPR) for a total of up to 232 stations.

Figure 2-3 shows the DEMPR.

The DEMPR offers:

- Support of up to eight ThinWire Ethernet connections
- Support of multiple Ethernet devices for each connection
- Easy installation

Figure 2-3: DIGITAL ThinWire Ethernet Multiport Repeater (DEMPR)



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DIGITAL ThinWire Ethernet Single Port Repeater (DESPR)

A DESPR is a single port repeater. Use it in an area that requires a single ThinWire connection to standard Ethernet. The DESPR retimes, amplifies, and repeats all signals received from the ThinWire segment and passes the signals to the standard Ethernet. The ThinWire segment can support up to 29 station-to-station daisy-chained connections made using T-connectors.

DIGITAL ThinWire Ethernet Station Adapter (DESTA)

The DESTA is an Ethernet/IEEE 802.3 transceiver that provides a single physical connection between standard Ethernet and Ethernet communication equipment. The DESTA connects to devices (such as the MicroVAX II, MicroVAX 2000, VAXstation II, VAXstation II/GPX, VAX-11/7xx, VAX/8xxx, Professional 300, and PDP-11) that do not have an integral ThinWire transceiver attached to their communications controller.

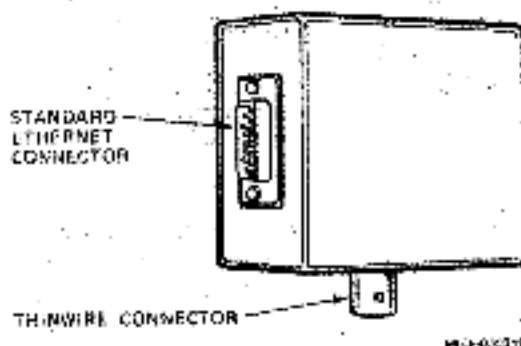
The VAXstation 2000 has an integral ThinWire transceiver attached to its communications controller and has no need for a DESTA.

The DESTA has two ports: one port connects to the T-connector connected to ThinWire, a second port connects to a transceiver cable that leads to a system. Figure 2-4 shows a DESTA.

The DESTA provides:

- Connection of a system with a transceiver cable to ThinWire Ethernet.
- Attachment to devices connected to Ethernet communications controllers by way of transceiver cables.

Figure 2-4: DIGITAL ThinWire Ethernet Station Adapter (DESTA)

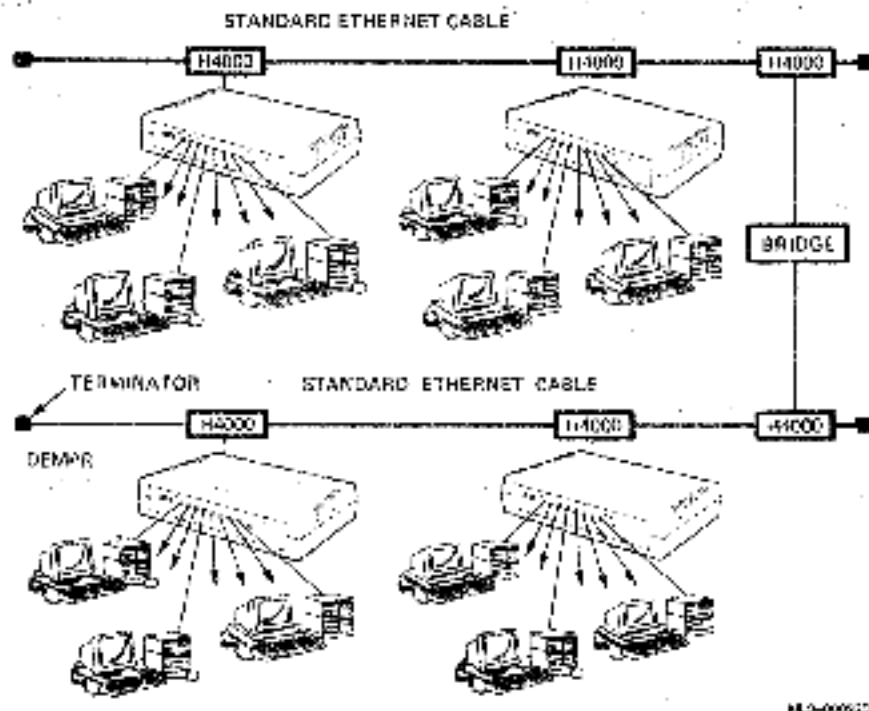


The Ethernet Bridge—LAN Bridge 100 (DEBET-AA)

The LAN Bridge 100 (DEBET-AA) is a local area network bridge that connects two standard Ethernet LANs, creating an extended LAN. An extended LAN configuration has the potential to span a much greater area than a single standard Ethernet LAN.

Figure 2-5 shows a DEBET bridging two LAN segments, creating an extended LAN.

Figure 2-5: Local Bridge



DEBETs provide network traffic control and prevent the extended LAN from being overwhelmed by the combined traffic on each of its standard LANs. A DEBET confines local traffic to one standard Ethernet LAN. Only traffic that is destined for another standard LAN is allowed to cross over the DEBET.

Unshielded Twisted-Pair Ethernet Adapters

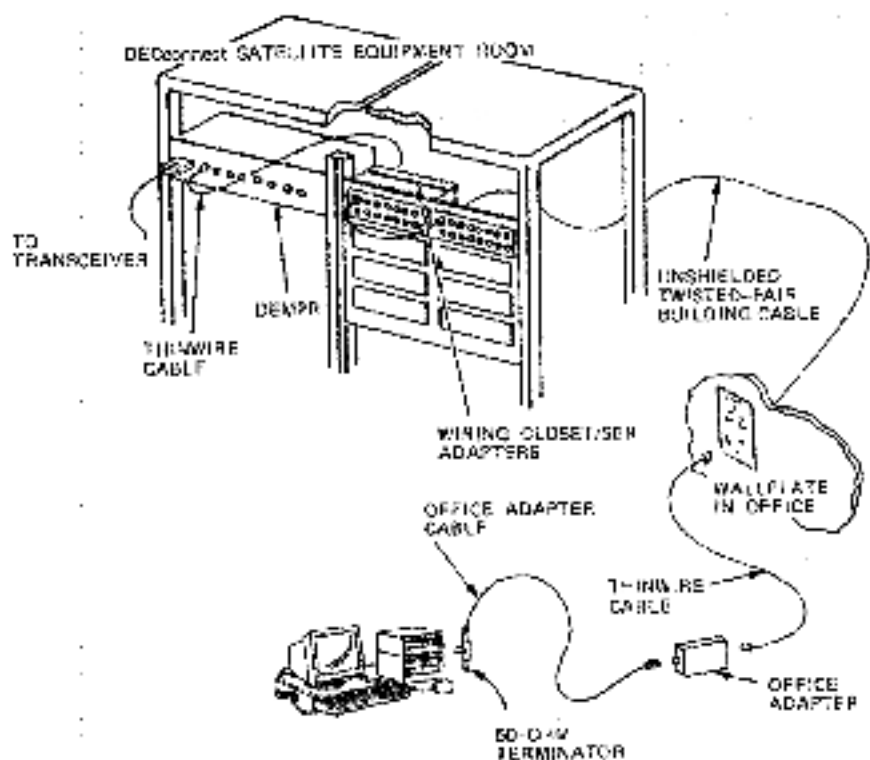
Unshielded twisted-pair cable is recommended as an alternative to ThinWire cable in buildings where unshielded twisted-pair cable is already installed, or where using ThinWire cable is impractical.

The Unshielded Twisted-Pair Ethernet Office Adapter, when configured with an Unshielded Twisted-Pair Ethernet SER Adapter, supports Ethernet communications over 70 m (230 ft) of unshielded twisted-pair building cable to a single station. See the *Unshielded Twisted-Pair Ethernet Adapter Installation Guide* for more information.

Note: ThinWire cable supports a significantly greater cable length (185 m) and up to 30 stations on a segment; in addition, ThinWire cable has greater immunity to noise.

Figure 2-6 shows an Unshielded Twisted-Pair Ethernet configuration.

Figure 2-6. Unshielded Twisted-Pair Adapters



ThinWire Configurations

A ThinWire configuration is an economical way to connect VAXstation 2000s and MicroVAX 2000s in a network.

Figure 2-7 shows the symbols for cables used in the ThinWire configurations in this section.

Figure 2-7: Symbols for Cables

STANDARD ETHERNET COAXIAL CABLE	
THINWIRE ETHERNET COAXIAL CABLE	
TRANSCEIVER CABLE	

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Three ways to design a ThinWire configuration are:

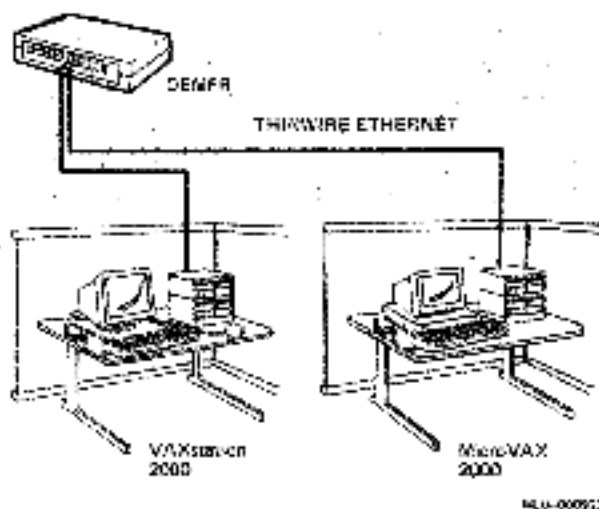
1. DECconnect approach
2. Daisy-chain wiring approach
3. Combined DECconnect and daisy-chain approach

DECconnect Approach

The DECconnect approach to wiring uses a single ThinWire cable for each system. This approach is flexible and reliable. It is reliable because no other systems come between your system and the Office Communications Cabinet, the Satellite Equipment Room, or the DEMPR. Consult your DIGITAL representative for more information about DECconnect. The appendix lists the DECconnect documentation.

Figure 2-8 shows a single system on each ThinWire segment connected to a DEMPR.

Figure 2-8: DECconnect Method of Wiring



Daisy-chain Approach

A second approach to ThinWire configurations discussed in this guide is the daisy-chain method of wiring. Several systems are connected to the same ThinWire segment. That segment can function as a stand-alone network or can be connected to a central equipment room.

The daisy-chain approach lowers the cost of wiring, but there is a risk that someone might improperly unplug a system and make the network connections inoperative between the systems on the same ThinWire segment.

Combined Daisy-chain and DECconnect Approach

A third way to improve reliability and lower costs is to combine the daisy-chain and DECconnect approaches.

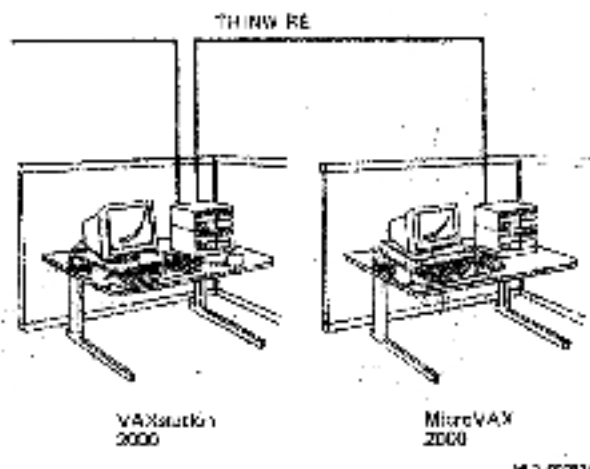
To do this, run a single ThinWire cable from the DEMPR in the Satellite Equipment Room or DECconnect Office Communications Cabinet to a work group. The members of the work group can then daisy-chain their equipment from this wire. By isolating the daisy-chain in a work group, members can control the wiring of their part of the network. This procedure eliminates the risk of outside groups improperly unplugging a system and disrupting the network.

Single Segment Configuration

Figure 2-9 shows a ThinWire configuration in an office environment where VAXstation 2000 and MicroVAX 2000 systems are serially linked to a single segment of ThinWire Ethernet cable in a local area network (LAN).

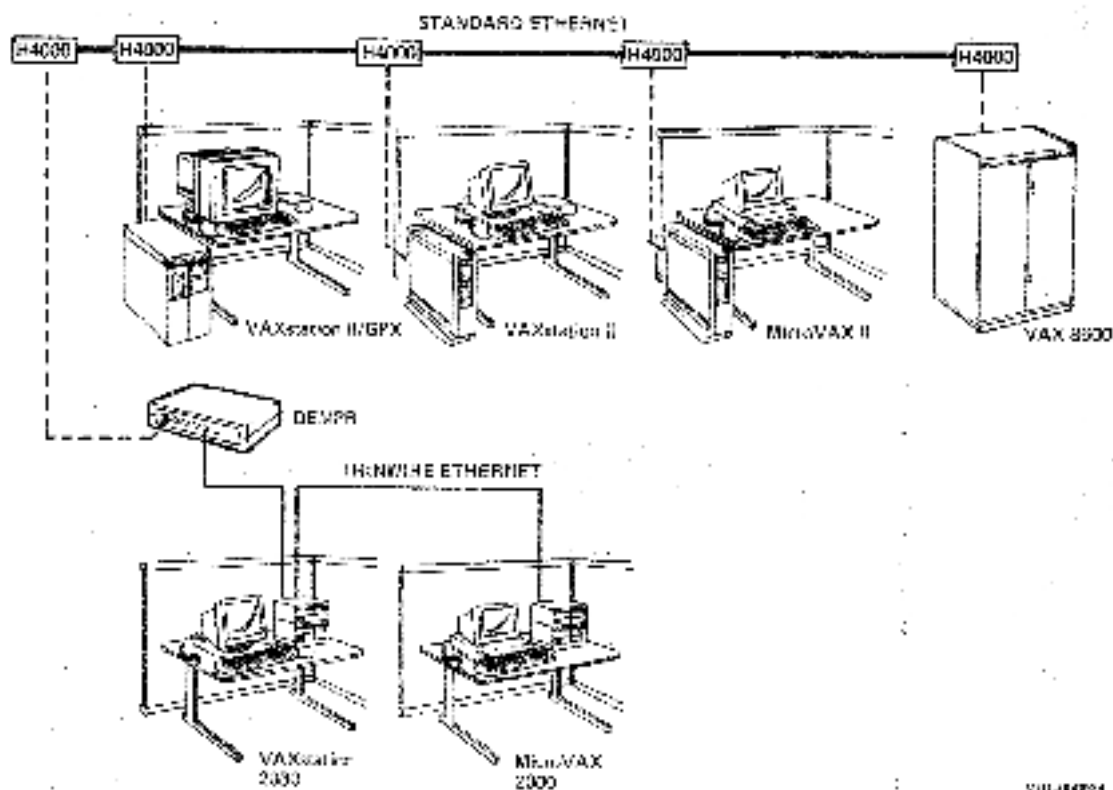
Chapter 3 describes how to connect systems with ThinWire cable.

Figure 2-9: Single Segment Configuration



A local area network may be part of a larger network. For example, a department of a large company that uses ThinWire Ethernet in a LAN, shown in Figure 2-9, to communicate in its own department may also communicate with other departments in the company. In Figure 2-10, the department's local area network is connected to the company's larger network by a DEMPR. The H4000 shown in Figure 2-10 is a transceiver that provides a single connection between standard Ethernet and Ethernet communication equipment.

Figure 2-10: Connecting ThinWire Ethernet to Standard Ethernet

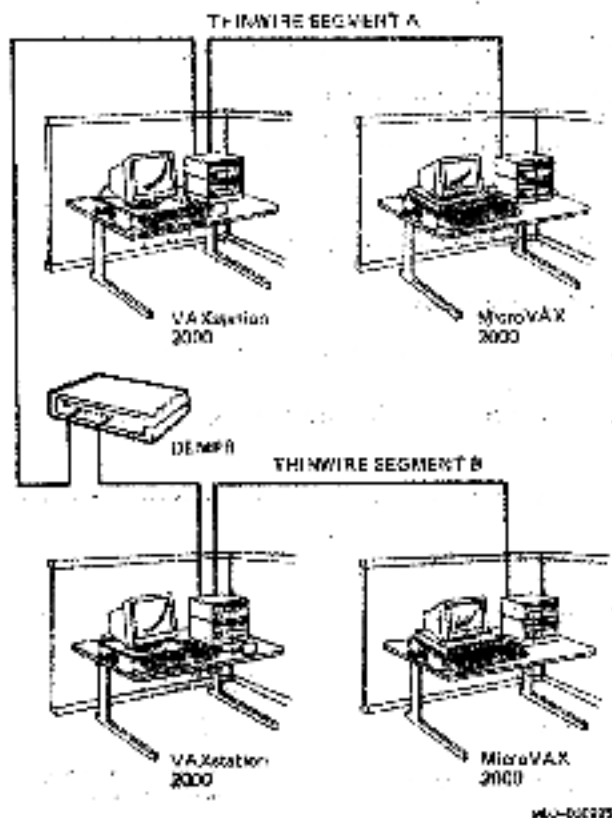


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Multisegment ThinWire Configuration

Figure 2-11 shows a multisegment ThinWire configuration that uses the DEMPR to connect several ThinWire segments.

Figure 2-11: Multisegment ThinWire Configuration



ThinWire Ethernet Rules

This section describes the rules for:

- Setting up:
 - A single segment ThinWire Ethernet LAN
 - A stand-alone DEMPR
 - A combined standard/ThinWire Ethernet LAN
 - Stand-alone cascading DEMPRs
 - Stand-alone DELNY with DEMPRs
 - Local bridge (DEBET)
- Disconnecting stations from ThinWire Ethernet

Configurations Symbols

Figure 2-12 shows the symbols used in this section.

Figure 2-12: Symbols for Configurations

STANDARD ETHERNET COAXIAL CABLE	
THINWIRE ETHERNET COAXIAL CABLE	
TRANSCEIVER CABLE	
TERMINATOR	
T-CONNECTOR	
ETHERNET TRANSCEIVERS	
STATION	
LOCAL BRIDGE	

800-000000

Single Segment ThinWire Ethernet

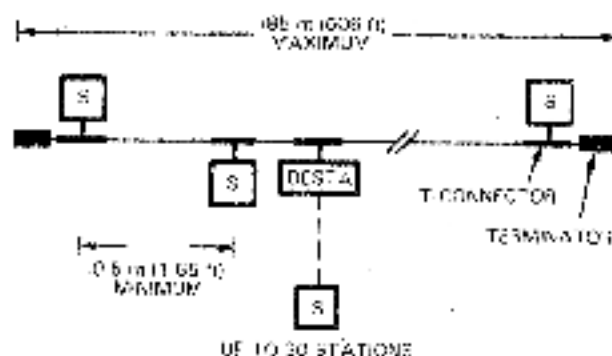
The following rules for single segment ThinWire Ethernet apply to all ThinWire Ethernet configurations:

- Use only DIGITAL ThinWire cable or a DIGITAL qualified equivalent cable that meets the IEEE 802.3 specifications.
- ThinWire cable segments cannot be configured in a loop.
- No cable segment can be placed between the T-connector and the attached station or DESTA.
- The minimum bend radius of ThinWire cable is 2 m (.75 in).
- The maximum length of a ThinWire Ethernet segment is 185 m (606 ft). Each segment can consist of smaller sections connected by barrel connectors or T-connectors.
- Stations must be attached to T-connectors. No branch segments can extend off the main segment.
- There must be at least 0.5 m (1.6 ft) of ThinWire between stations.
- There must be at least 0.5 m (1.6 ft) of ThinWire between barrel connectors.
- The maximum number of daisy-chained stations allowed on a segment is 30. If you use a barrel connector to connect two sections of cable, you must decrease the allowed number of stations by one for each barrel connector used.
- One 50-ohm terminator must be at each end of a segment. If a segment is attached to a DEMPR, then only one terminator is needed on the end not attached to the DEMPR, because the DEMPR end has a terminator built into it.
- Only one earth ground point is necessary. If the station is attached to a DEMPR, the DEMPR provides this ground point.
- ThinWire Ethernet networks must adhere to the Ethernet 2-repeater rule: no more than two repeaters between any two stations. A repeater provides a means of extending Ethernet networks beyond the limits imposed by a single segment. The DEMPR counts as a single repeater.
- ThinWire Ethernet networks cannot exceed the Ethernet 1024-station limit for each area.

- ThinWire segments must remain in a building or a complex of buildings that shares common structural steel.

Figure 2-13 shows a single segment of ThinWire cable with stations connected.

Figure 2-13: Single Segment ThinWire Configuration



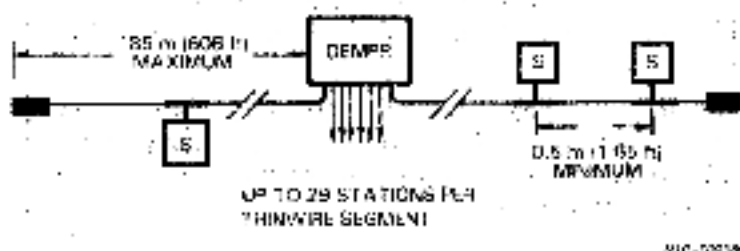
Stand-alone DEMPR

A stand-alone DEMPR is a DEMPR that is not connected to a larger network. Each segment attached to a DEMPR must use the guidelines for single segment ThinWire Ethernet and the following guidelines:

- One to eight ThinWire cables can be attached to a DEMPR.
- Each cable can be up to 185 m (606 ft) long.
- Each cable can have up to 29 stations (the 30th position is taken by the DEMPR).
- Segments connected to the DEMPR must **NOT** be grounded. The DEMPR internally grounds the eight ThinWire segments.

Figure 2-14 shows a stand-alone DEMPR with ThinWire cables.

Figure 2-14: Stand-alone DEMPR with ThinWire Cables



Combined Standard/ThinWire Ethernet LAN

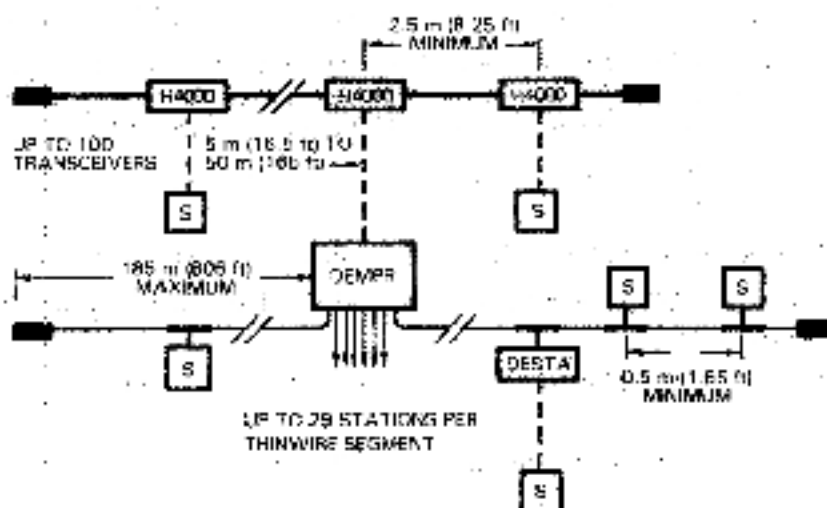
A configuration that uses both standard Ethernet and ThinWire Ethernet should follow the guidelines for the stand-alone DEMPR with the following additions:

- A DEMPR can attach to a standard Ethernet by an H4000 transceiver or a DELNI. A DEMPR permits up to eight ThinWire Ethernet connections from the single (H4000) transceiver tap.
- A DELNI is a DIGITAL Ethernet Local Network Interconnect device that provides eight separate 15-pin standard Ethernet network connections from a single transceiver tap.
- If you connect a DEMPR to standard Ethernet by a DELNI, you must connect the DELNI to Ethernet by an H4000-BA. The H4000-BA is a transceiver designed to connect standard Ethernet LANs. The H4000-BA does not transmit a heartbeat (used in network diagnostics), therefore none of the devices attached to a DELNI will receive a heartbeat. The absence of a heartbeat does not impact network performance. In fact, DIGITAL recommends using the DELNI for DEMPRs that are connected to a network.

Note: If you are connecting your ThinWire Ethernet network to a larger network, consult the *network coordinator* to make sure that you have a unique node name and address for your system and are adhering to the network configuration rules.

Figure 2-15 shows a DEMPR on a standard Ethernet coaxial cable.

Figure 2-15: DEMPR on Standard Ethernet



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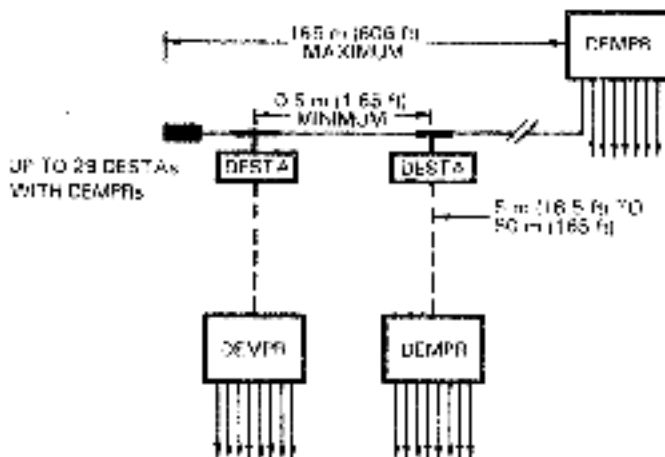
Stand-alone Cascading DEMPRs

This configuration follows the guidelines for the stand-alone DEMPR and the following:

- Cascading DEMPRs cannot be connected to a standard Ethernet LAN.
- Up to two DEMPRs are allowed between stations. Therefore, you can cascade DEMPRs on one of the ThinWire cables attached to a DEMPR. You must use a DELNI to cascade DEMPRs as shown in Figure 2-17.
- The ThinWire cable with the cascading DEMPRs can be up to 185 m (606 ft) long.
- Connect the DEMPRs to ThinWire cable, using DESTA transceivers.
- Up to 29 DESTAs (with their corresponding DEMPRs) are allowed on the ThinWire cable.
- There must be at least 0.5 m (1.6 ft) of ThinWire cable between DESTAs or stations.

Figure 2-16 shows stand-alone cascading DEMPRs.

Figure 2-16: Stand-alone Cascading DEMPRs



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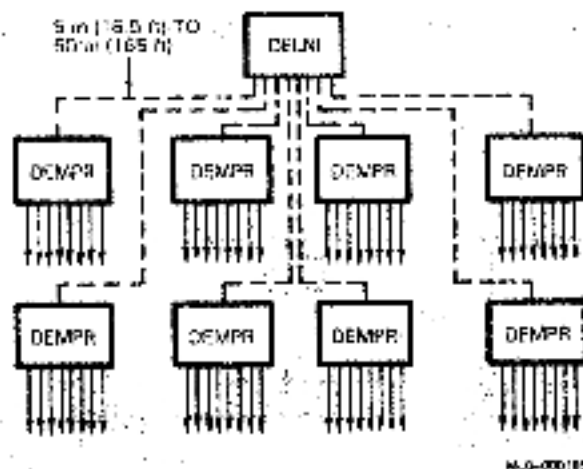
Stand-alone DELNI with DEMPRs

The guidelines for a stand-alone DELNI with DEMPRs are:

- Using the DELNI in global mode with a loopback connector attached to the ninth port, you can connect up to eight DEMPRs, using 5 to 50 m (16.5 to 165 ft) of transceiver cable for each DEMPR.
- Only two DEMPRs are allowed between stations. You cannot have a cascading DEMPR on a DEMPR attached to a DELNI.
- Conventions for ThinWire cables connected to the DEMPRs are the same as those defined for a stand-alone DEMPR.

Figure 2-17 shows a stand-alone DELNI with DEMPR(s).

Figure 2-17: Stand-alone DELNI with DEMPRs



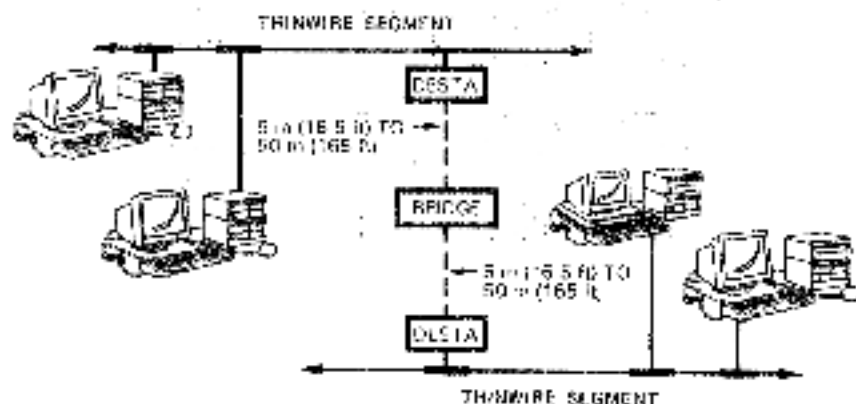
Local Bridge

To prevent an extended LAN from being overloaded by the combined traffic of each LAN segment, insert a bridge between the segments to act as a filter. Then, only messages addressed to stations on the other side of the bridge will pass through the bridge. That process is called packet filtering. A bridge is most often used to connect LANs in the same building. Basic configuration guidelines are:

- A local bridge joins two LANs by transmitting signals over connecting transceiver cables, creating an extended LAN. Each transceiver cable can be 5 to 50 m (16.5 to 165 ft) long.
- A bridge lets you get around the 2-repeater rule. Once a message goes through a bridge, two more repeaters can be used in the next LAN to extend the network. Up to seven bridges are allowed between stations.
- A local bridge connects to the Ethernet through a DESTA.

Figure 2-18 shows a local bridge connecting two segments of ThinWire Ethernet.

Figure 2-18: Local Bridge



Disconnecting Stations from ThinWire Ethernet

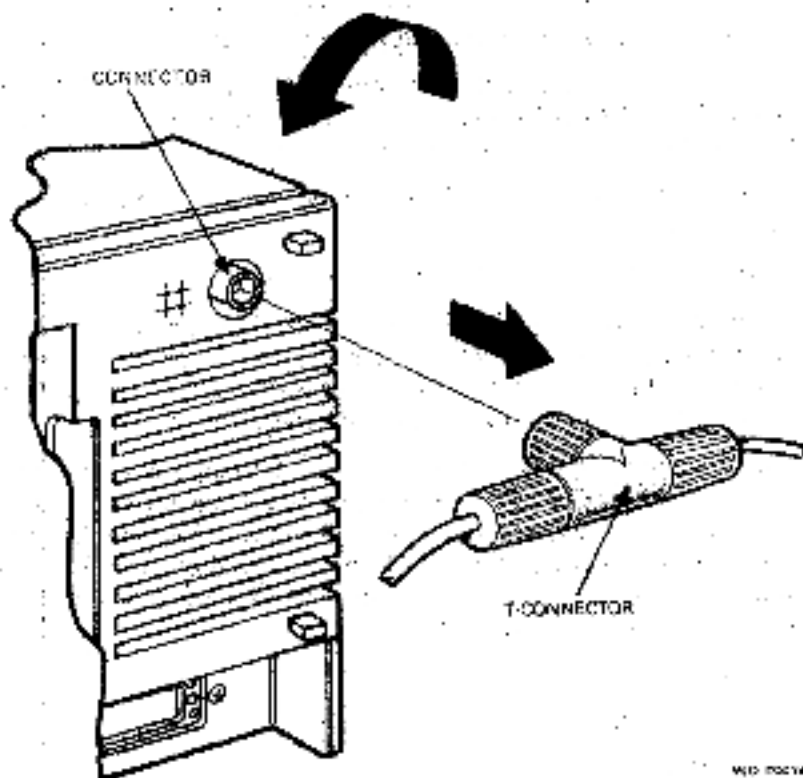
The rule for disconnecting stations from ThinWire is:

- Remove the T-connector from the station.

Caution: Do not remove the T-connector from the cable. This procedure will break the connection on the ThinWire segment and disrupt all stations on the segment.

Figure 2-19 shows how to disconnect a station from a ThinWire segment.

Figure 2-19: Disconnecting a Station from ThinWire Ethernet



Local Area VAXcluster Configuration

Using ThinWire Ethernet as the common interconnect, Local Area VAXcluster software extends many benefits of the VAXcluster architecture to VAXstation 2000 and MicroVAX 2000 systems.

A Local Area VAXcluster consists of one or two *boot nodes* (also called *boot members*) and up to 26 *satellite nodes*.

- The boot node is both a management center for the cluster and a major resource provider. Its system disk contains the cluster common files for startup, authorization and queue setup, as well as the directory roots from which the satellite nodes are booted.

A boot node makes available to the cluster such resources as user and application data disks, printers, and distributed batch-processing facilities.

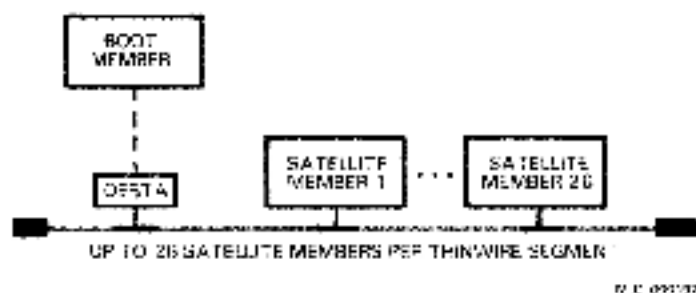
In a Local Area VAXcluster, the boot node may be any VAX system except VAX-11/725 or VAX-11/730, or the boot node may be one of the following MicroVAX or VAXstation II systems:

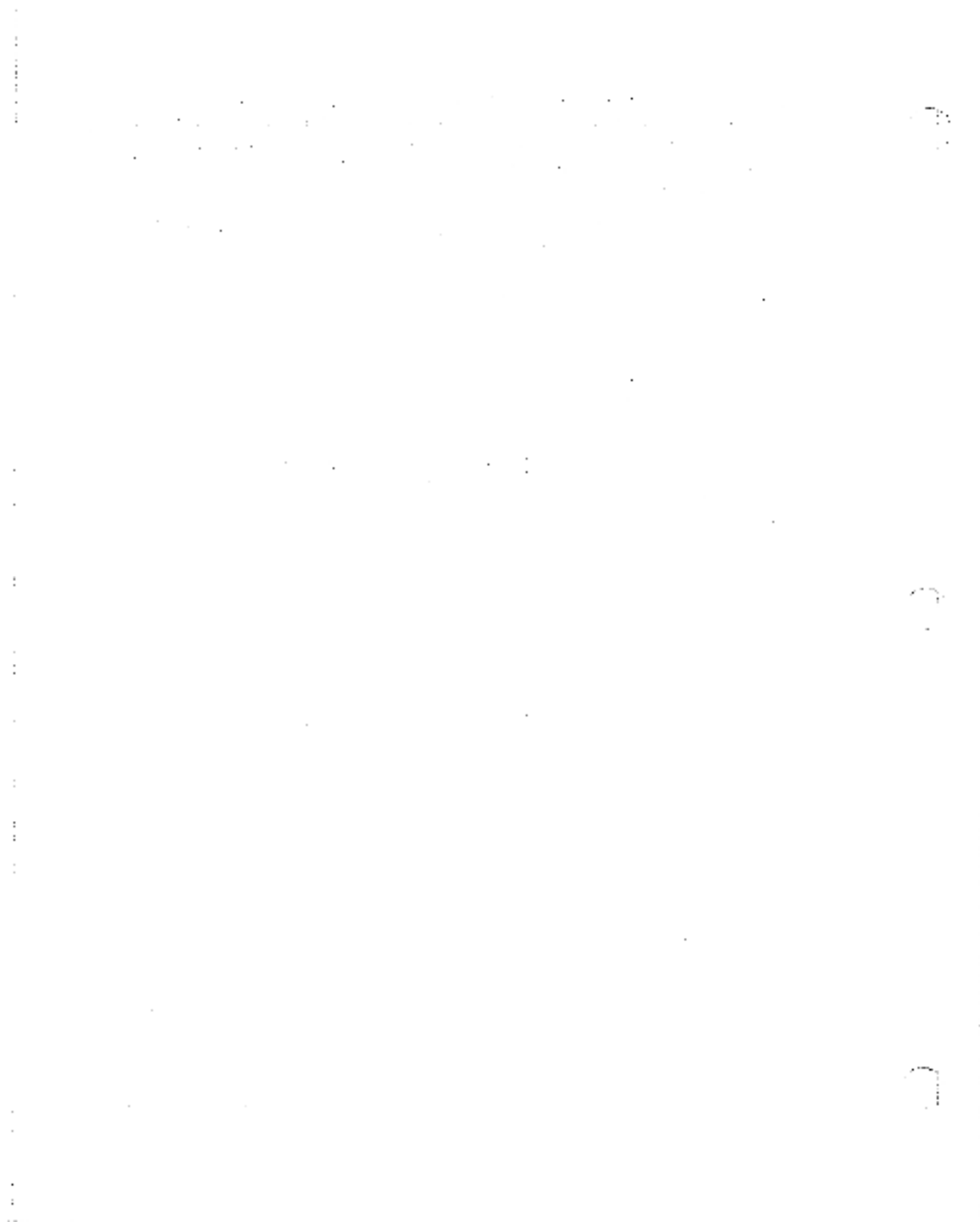
- MicroVAX 2000 with an RD54 system disk (recommended for three workstations).
- MicroVAX II with an RA-series system disk.
- MicroVAX II with an RD54 system disk or VAXstation II with an RD54 or any larger system disk. Those boot nodes support a maximum of three satellites. In addition, it is recommended that the satellites use local RD-series disks for paging and swapping.
- The satellite nodes are booted remotely from a boot node's system disk. Generally, those nodes are consumers of cluster resources, though they may sometimes provide disk-serving and batch-processing resources. If satellite nodes are equipped with RD-series disks, they may, for enhanced performance, use such local disks exclusively for paging and swapping. Satellite nodes may be any of the following:
 - MicroVAX II
 - MicroVAX 2000
 - VAXstation II
 - VAXstation 2000
 - VAXstation II/GPX
 - VAXstation II/RC

Caution: All MicroVAX II and VAXstation II systems in a Local Area VAXcluster configuration must use Revision E (or later) Q-bus Network Adapter (DEQNA) devices and must have at least 3 Mb of memory. Diskless systems need at least 4 Mb of memory. Diskless systems should not be turned off.

Figure 2-20 shows a diagram of a boot node and some of its 26 satellite nodes connected on ThinWire Ethernet.

Figure 2-20: Local Area VAXcluster





Chapter 3

Installing ThinWire Hardware

This chapter describes how to determine your networking needs and how to install and troubleshoot a ThinWire Ethernet network.

Before You Start

If you are setting up a Local Area Network (LAN), you need to designate a network coordinator to manage the network, assign unique node names and addresses for each station on the network, and provide administrative assistance to network users.

If you are connecting a ThinWire Ethernet LAN to an existing network, consult the network coordinator on the best way to connect your LAN to the larger network. Consult the network coordinator to ensure that all node names and node addresses on your LAN are unique and do not already exist in the larger network.

Determining Your Needs

This section helps you determine what ThinWire Ethernet equipment you need.

ThinWire Ethernet Cable

The maximum recommended length of cable leading from a terminator to the last station on a segment of ThinWire Ethernet is 185 m (606 ft). At least 0.5 m (1.6 ft) is required between stations.

Connectors

A ThinWire section is a single length cable. You need two connectors, one at each end, for each section of ThinWire cable.

Barrel Connectors and T-Connectors

A ThinWire segment is one or more sections of ThinWire cable interconnected by barrel or T-connectors. You need one T-connector for each DESTA, VAXstation 2000, or MicroVAX 2000.

DESTA and Transceiver Cable

To connect a VAXstation II, VAXstation II/GPX, MicroVAX II, Professional 300, PDP-11, VAX system, or any devices like a bridge, repeater, or server that use transceiver cables to ThinWire Ethernet, you need a DESTA and a transceiver cable.

Terminators

You need one terminator for each end of a ThinWire segment. If you connect a ThinWire segment to a DEMPR, you need only one terminator. The end connected to the DEMPR does not need a terminator.

You need a terminator for each unused connector on the DEMPR.

DEMPR

You can use a DEMPR to connect eight segments of ThinWire Ethernet in a LAN.

Estimating Your Needs

You can use the form in Table 3-1 to estimate what you need to order.

Table 3-1: Form to Order ThinWire Equipment

	Amount
Total length of ThinWire Ethernet cable	_____
Connector	_____
Barrel connector	_____
T-connector	_____
DESTA	_____
Transceiver cable	_____
Terminator	_____
DEMPR	_____

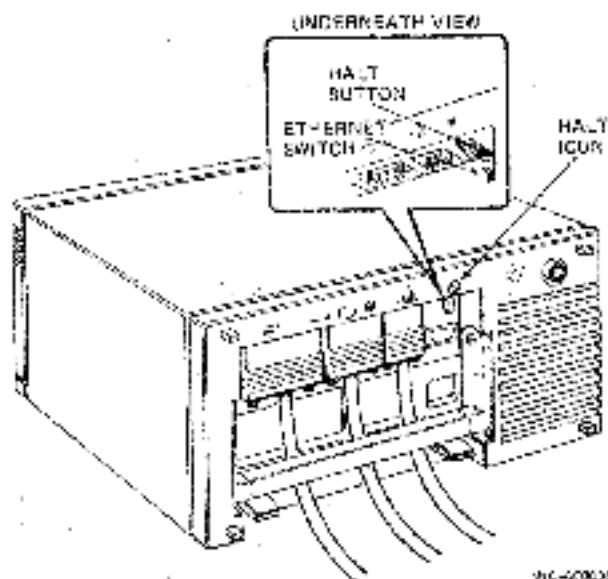
Planning the ThinWire Segment

We recommend that you plan for any future stations by connecting extra T-connectors and ThinWire segments where future stations might be needed.

Setting the Switch for ThinWire Ethernet

To use ThinWire Ethernet on a VAXstation 2000, move the Ethernet switch on the back of the system unit to the up position (Figure 3-1).

Figure 3-1: Setting the Switch for ThinWire Ethernet



Connecting to a ThinWire Ethernet Segment

The two types of stations that can connect to ThinWire Ethernet are:

1. Stations with connectors--VAXstation 2000 or MicroVAX 2000.
2. Stations with a transceiver cable--VAXstation II, VAXstation II/GPX, MicroVAX II, Professional 300, PDP-11, VAX-11/7xx, or VAX/8xxx.

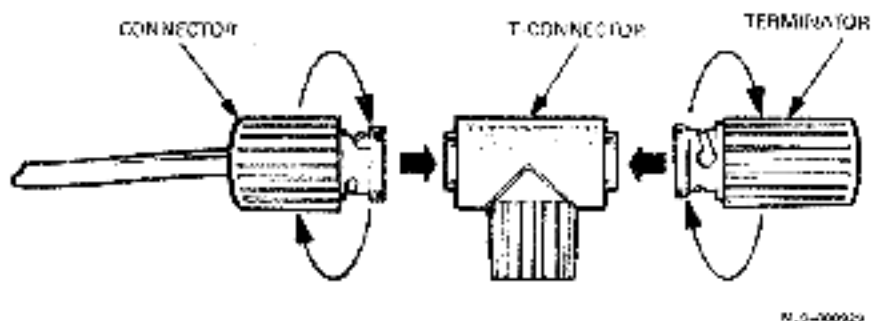
Follow the instructions for the type of station you have.

Connecting a VAXstation 2000 or MicroVAX 2000

To connect a VAXstation 2000 or MicroVAX 2000 to ThinWire Ethernet:

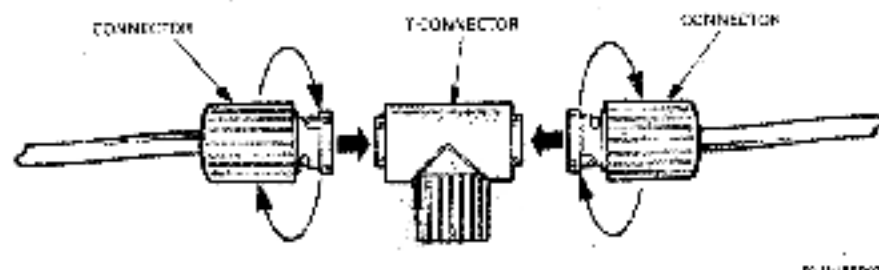
1. Set the power switch to off (0) on the station.
2. Attach ThinWire cable to one side of the T-connector as shown in Figure 3-2.
3. If the station is the first or last station in a single ThinWire segment, attach a terminator to the other side of the T-connector as shown in Figure 3-2.

Figure 3-2: Connecting a Terminator to the T-connector



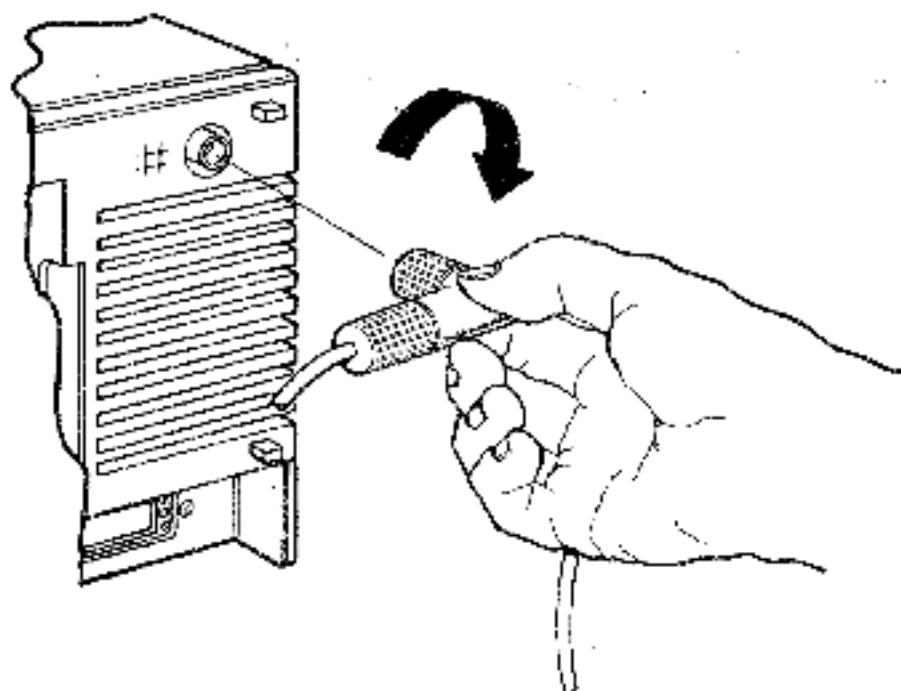
4. If the station is not the first or last station and you want to connect another station to the ThinWire cable, add another section of ThinWire cable to the T-connector as shown in Figure 3-3.

Figure 3-3: Adding a Segment to the T-connector



5. Attach the T-connector to the back of the station by pushing the T-connector into the connector and then turning it to the right as shown in Figure 3-4. That figure shows the cabling for only the VAXstation 2000. If you have a MicroVAX 2000, locate the connector on the back and connect the T-connector in the same way as on the VAXstation 2000.

Figure 3-4: Connecting the T-connector to VAXstation 2000



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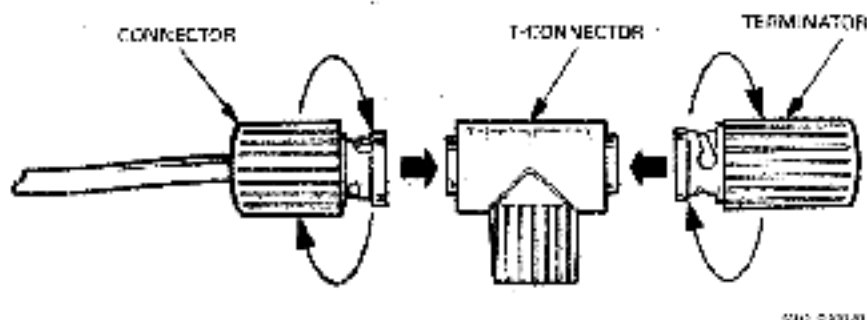
6. If you want to attach another station to the ThinWire cable, follow the directions for the type of station you have.

Connecting a Station with a Transceiver Cable

To connect a station with a transceiver cable, such as a MicroVAX II, VAXstation II, VAXstation II/GPX, or any other VAX-11/7xx or VAX/8xxx:

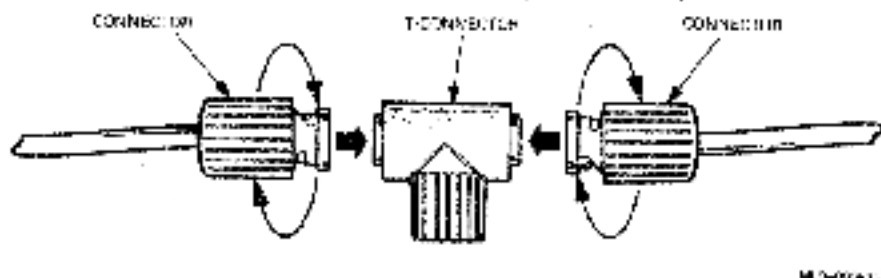
1. Set the power switch to off (0) on the station.
2. Attach ThinWire cable to one side of the T-connector as shown in Figure 3-5.
3. If the station is the first or last station in a single ThinWire segment, attach a terminator to the side of the T-connector not connected to the ThinWire cable as shown in Figure 3-5.

Figure 3-5: Connecting a ThinWire Segment and Terminator to the T-connector



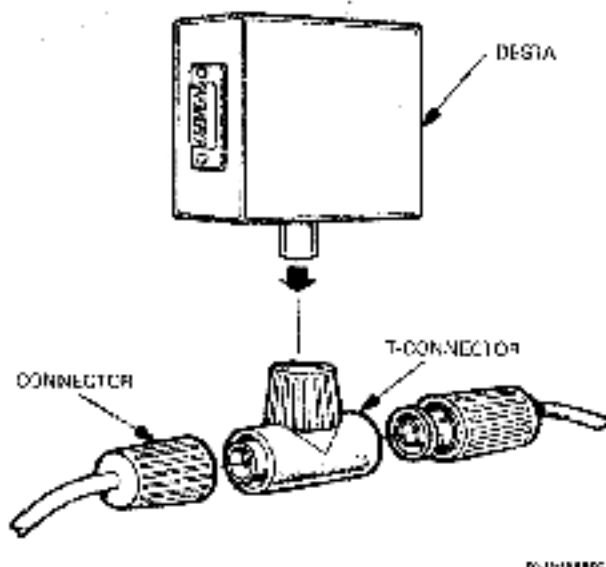
4. If the station is not the first or last station and you want to connect another station to the ThinWire cable, add another section of ThinWire cable to the T-connector as shown in Figure 3-6.

Figure 3-6: Adding a Segment to the T-connector



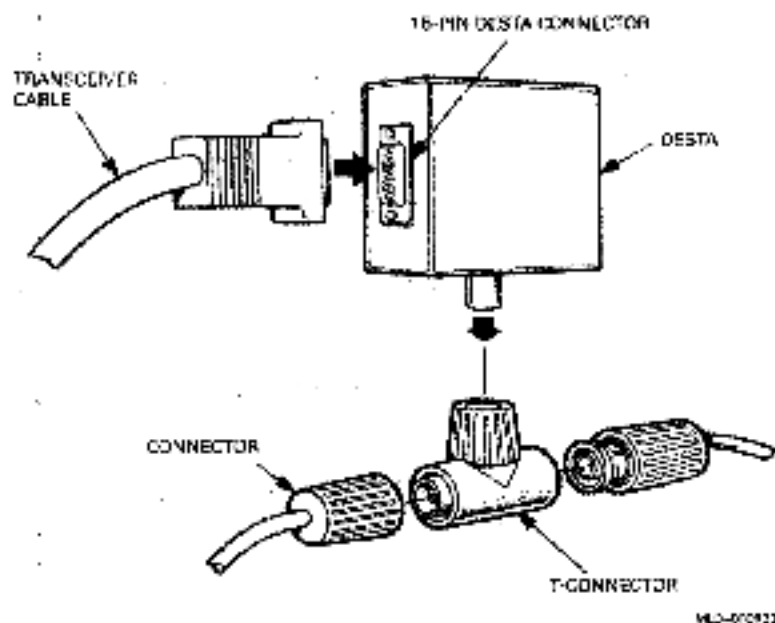
5. If your station has a transceiver cable, attach the T-connector to the DESTA's connector as shown in Figure 3-7.

Figure 3-7: Attaching the T-connector to the DESTA



6. Attach the 15-pin connector on the transceiver cable to the DESTA as shown in Figure 3-8.

Figure 3-8: Attaching the Transceiver Cable to the DESTA



7. Attach the transceiver cable to the back of the station.
8. If you want to attach another station to ThinWire, follow the directions for the type of station you have.

Connecting to an Existing ThinWire Network

Caution: When you plan ThinWire segments, be aware that disconnecting one of the stations from the segment (by removing its T-connector from the cable) causes a disruption of that segment. However, removing the T-connector from a station does not disturb the segment, and other segments in the network are not affected.

If you planned ahead and have a T-connector for every place that you anticipated adding a station, plug the T-connector into the station.

If you need to add more T-connectors, do the following:

1. Notify all stations on the segment that the network will be down for a period of time to add new stations.
2. Add new stations to the ThinWire segment, following the directions for the type of station you have.

How to Install a DEMPR on ThinWire Ethernet

Before installing a DEMPR:

1. Find a suitable location for the DEMPR unit. You need a clearance of 10.16 cm (4 in) on all sides of the DEMPR unit to ensure proper ventilation.
2. Be sure the ac power outlet is within 1.83 m (6 ft) of the installation location.

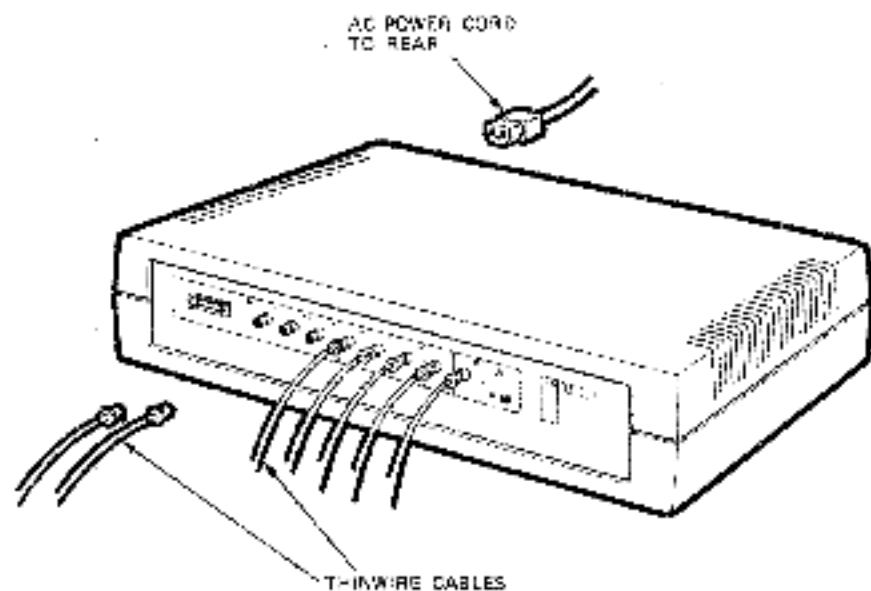
See the *DIGITAL Ethernet ThinWire Multiport Repeater (DEMPR) Installation and User's Guide* to verify installation of the DEMPR and to do a self-test before connecting the DEMPR to an active network.

Stand-alone DEMPR

To set up a stand-alone DEMPR:

1. Set the power switch to off (0) on all stations.
2. Connect each station to a ThinWire Ethernet segment as described in the Connecting to a ThinWire Ethernet Segment section.
3. Connect each ThinWire Ethernet segment to a connector on the DEMPR. Figure 3-9 shows ThinWire cables connected to the DEMPR.

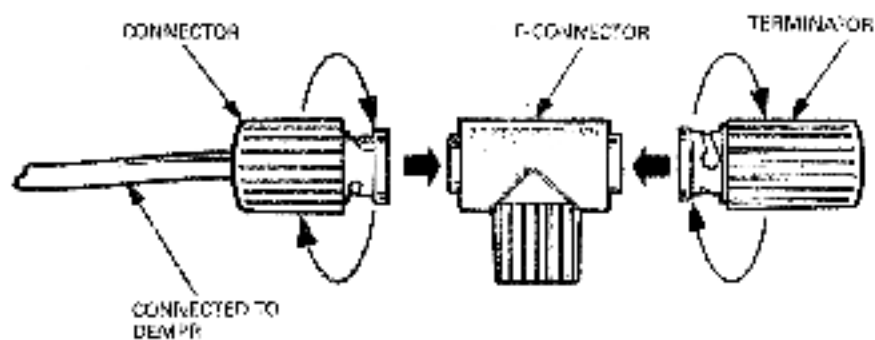
Figure 3-9: ThinWire Cables Connected to the DEMPR



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4. Attach a terminator to the end of each ThinWire segment connected to the DEMPR as shown in figure 3-10.

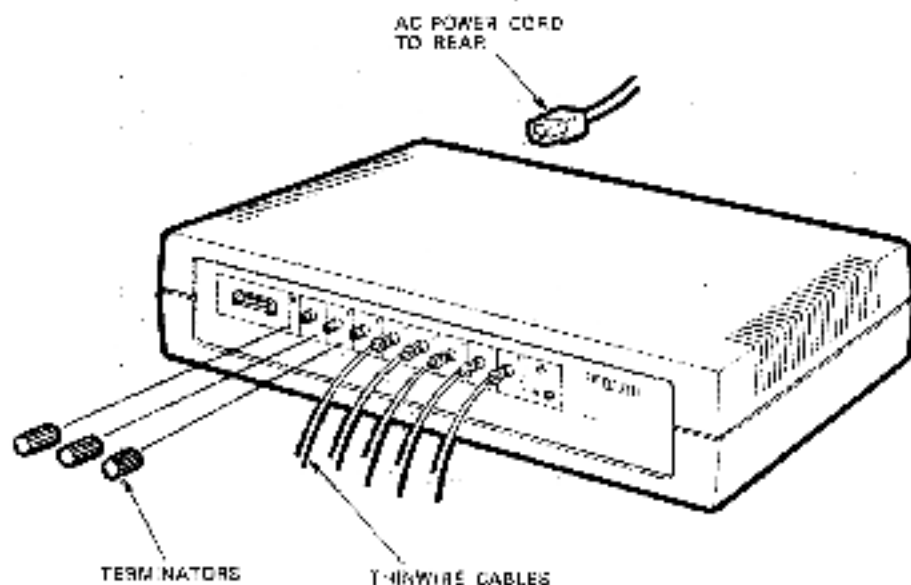
Figure 3-10: Attaching a Terminator to a ThinWire Segment



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5. Attach a terminator to any unused port on the DEMPR as shown in Figure 3-11.

Figure 3-11: Terminator Connected to the DEMPR



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Connecting the DEMPR to Standard Ethernet

Consult your network coordinator to connect the DEMPR to an existing Ethernet network.

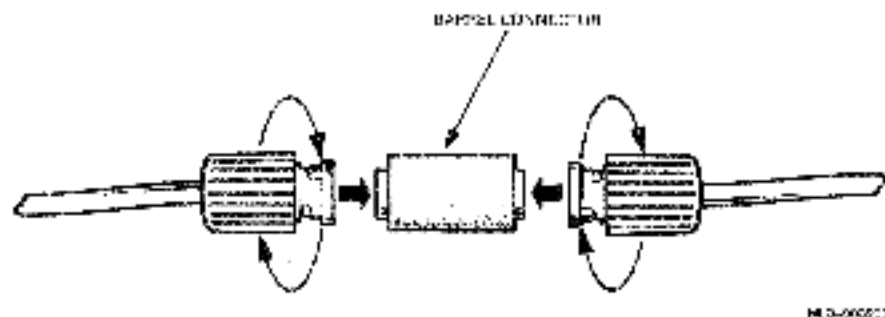
Connecting a DESPR to ThinWire Ethernet

The DESPR is an 802.3 compatible repeater that supports the connection of a single segment of ThinWire cable to standard Ethernet cable. DESPR installation and troubleshooting procedures are similar to the procedures for the DEMPR. For detailed instructions, see the *DESPR Installation/User's Guide* (EK-DESPR-UG).

How to Lengthen a ThinWire Segment

If you want to connect two ThinWire sections to lengthen the cable between stations, you can use a barrel connector. However, the barrel connector counts as a station on a ThinWire segment and decreases the number of stations you can place on the segment by one. Figure 3-12 shows how to connect two ThinWire sections, using a barrel connector.

Figure 3-12: Connecting Two ThinWire Sections



How to Verify ThinWire Ethernet Network Installation

1. After you have connected your station to ThinWire Ethernet, turn on your VAXstation 2060 or MicroVAX 2000. You will see the following:

```
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1
```

2. Then the prompt >>> appears. If the >>> does not appear, press the HALT button. Type the TEST 50 command at the prompt.

```
>>>TEST 50
```

The Ethernet hardware address and information about each module appear on the terminal screen.

The Ethernet hardware address has the following format:

```
ID XX-XX-XX-XX-XX-XX
```

and could look like this example:

```
ID 08-00-2B-02-CC-71
```

3. Write down your Ethernet hardware address and save it. Each Ethernet hardware address is unique. You or your network coordinator will need a unique Ethernet hardware address for each system when configuring DECnet software.

4. If the last line of information appearing in the TEST 50 display is:

```
NI 0000.0001
```

the Ethernet Module is installed and is functional.

If a number between 0000.0002 and .7000 appears on that line, there is a failure in the Ethernet module. Call a service representative.

If NI 0000.7000 or any number above .7000 appears on that line, check all Ethernet connections, using the checklist in the following Troubleshooting the ThinWire Segment section.

Troubleshooting the ThinWire Segment

If you have verified the ThinWire Ethernet installation and have found problems, use the following checklist to make sure all connections are correct:

1. Check that all connections are secure on the ThinWire Ethernet segment.
2. Do not connect the connector on the ThinWire cable to the connector on the station or on the DESTA. You must use a T-connector between the connector on the cable and the station or DESTA.
3. Do not connect any ThinWire segment between a ThinWire station and a T-connector. (The center of a T-connector must attach directly to a connector on the station.)
4. Do not connect any branches off a ThinWire segment except through a DEMPR. (You cannot branch off another segment of ThinWire cable from any segment unless you use a DEMPR.)
5. Do not loop a ThinWire segment from one port on the DEMPR to another port on the DEMPR.
6. Do not disconnect a T-connector from an operating ThinWire Ethernet segment to remove a station. Simply disconnect the center T-connector from the station.
7. Do not disconnect a terminator from an operating network. The procedure disrupts network operation.
8. After you have checked all ThinWire Ethernet connections, to retest the Ethernet Module, type the following command at the prompt:

```
>>>TEST 1 (or T 1)
```

9. If a connection is established, the >>> prompt appears.
10. If a connection is not established,

```
? 64 FAIL
```

appears.

If other data still appears on the last line of information on the power-up screen display, call your service representative.

Troubleshooting the DEMPR

See the *DIGITAL Ethernet ThinWire Multipoint Repeater (DEMPR) Installation and User's Guide* to verify installation of the DEMPR and to do a self-test before connecting the DEMPR to an active network.

Troubleshooting the DESTA

Check the following list to be sure the DESTA is functioning properly:

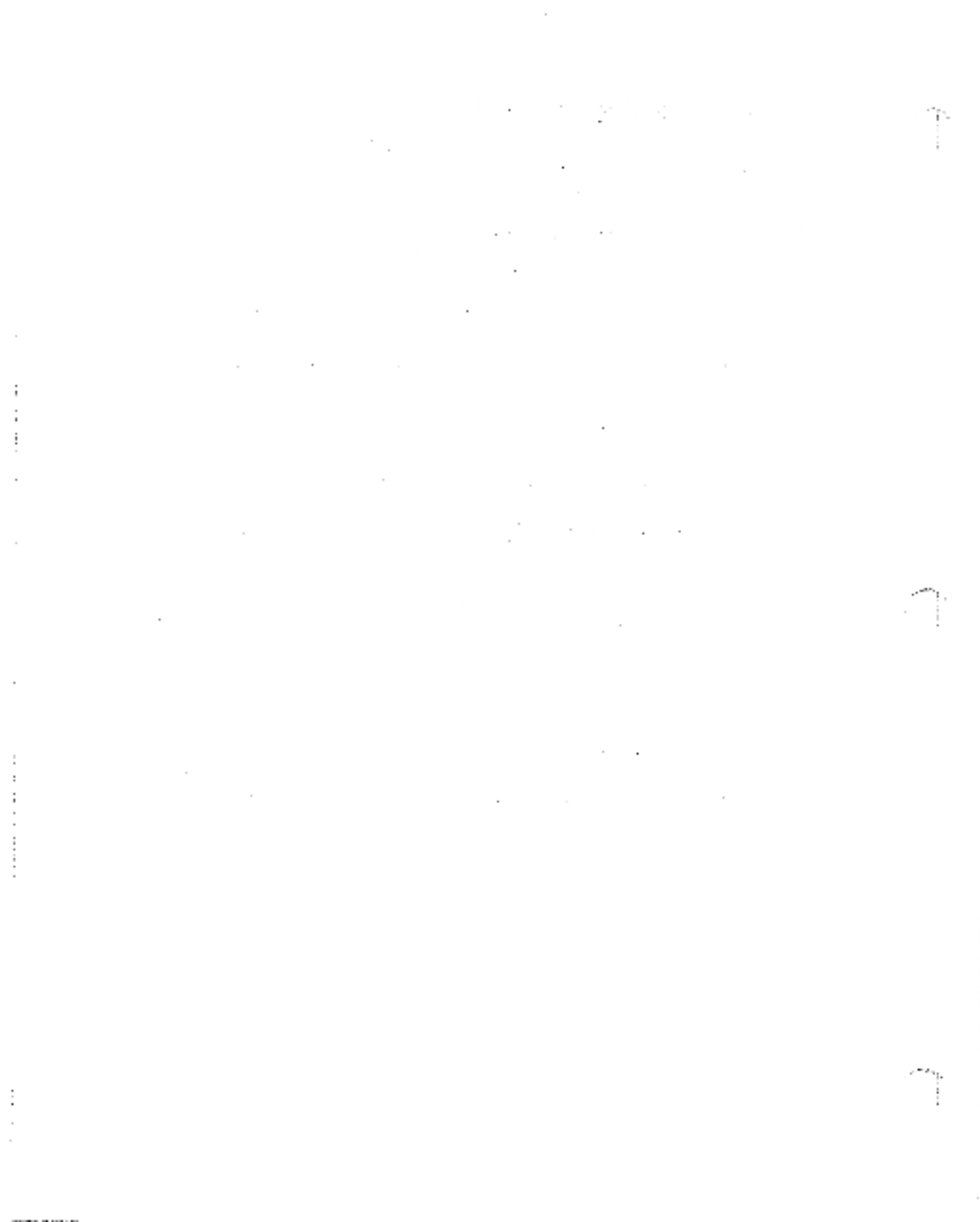
1. Check that the LED on the side of the box is lit. The LED shows that the DESTA has power.
2. If the LED is not lit and the DESTA is connected to a controller that is powered up, then your DESTA may need to be replaced.
3. If the LED is on but the unit is still suspect, try running an external self-test on the DEQNA or DEUNA controller.
4. If you cannot pinpoint the problem, call your field service representative.

Troubleshooting Unshielded Twisted-Pair Adapters

Unshielded Twisted-Pair Ethernet Adapters are a passive product and, as such, have no indicators, self-tests, or associated system diagnostics. Installation verification and troubleshooting procedures rely on external testing of ThinWire segments.

Troubleshooting Network Software

If you have verified the ThinWire installation and are not able to perform any network functions, such as copying files from one system to another, check that you have installed the correct communications software. Consult the documentation for the network software that you have installed.



Chapter 4

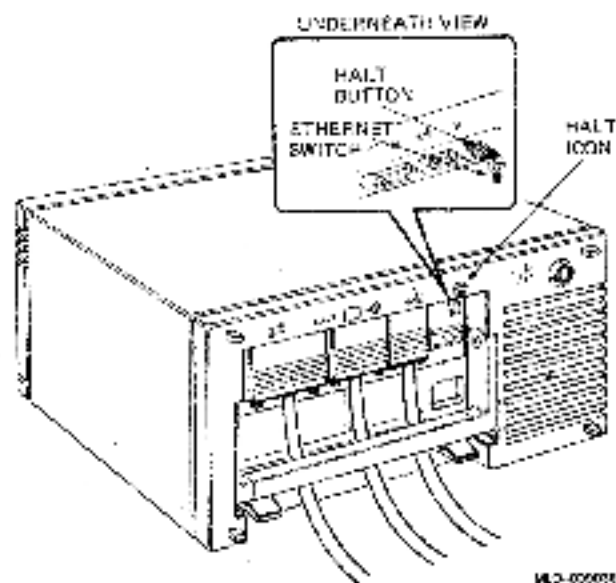
Connecting to Standard Ethernet

This chapter describes how to connect a system to standard Ethernet.

Setting the Switch for Standard Ethernet

To use standard Ethernet on your VAXstation 2000, move the Ethernet switch on the back of the system unit to the down position (Figure 4-1).

Figure 4-1: Setting the Switch for Standard Ethernet



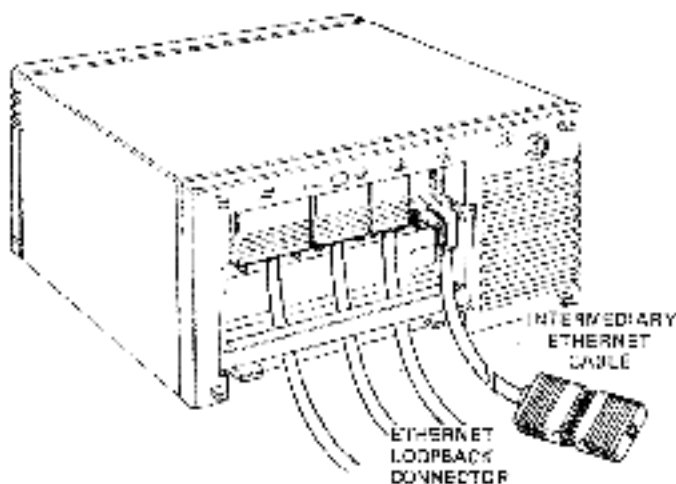
Using the Loopback Connector

If you connect your VAXstation 2000 or MicroVAX 2000 to standard Ethernet, you need to use a loopback connector to perform the power-up self-test. The loopback connector (Order No. 12-22196-01) is shipped with the VAXstation 2000 system or with the Ethernet module if purchased separately for the MicroVAX 2000.

To successfully complete the power-up self-test for a VAXstation 2000 or MicroVAX 2000, using standard Ethernet, follow these instructions:

1. Locate the Ethernet intermediary cable (Order No. 17-01860-01). Connect it to the back of the system unit as shown in Figure 4-2.
2. Connect the loopback connector to the end of the Ethernet intermediary cable (Figure 4-2).

Figure 4-2: Connecting the Intermediary Cable with Loopback Connector



M17-000070

3. Power up the system. The LED at the end of the loopback connector should light up when the system is powered up. If it does not light up, call your service representative.
4. With the loopback connector still connected to the intermediary cable, verify the network installation following the instructions in the next section.

How to Verify Standard Ethernet Network Installation

1. After you have connected your station to standard Ethernet, turn on your VAXstation 2000 or MicroVAX 2000. You will see the following:

```
F...E...D...C...B...A...9...8...7...6...5...4...3...2...1
```

2. Then the prompt >>> appears. If the >>> does not appear, press the HALT button. Type the **TEST 50** command at the prompt.

```
>>>TEST 50
```

The Ethernet hardware address and information about each module appear on the terminal screen.

The Ethernet hardware address has the following format:

```
ID XX-XX-XX-XX-XX-XX
```

and could look like this example:

```
ID 08-00-2B-02-0C-71
```

3. Write down your Ethernet hardware address and save it. Each Ethernet hardware address is unique. You or your network coordinator will need a unique Ethernet hardware address for each system when configuring DECnet software.
4. If the last line of information appearing in the TEST 50 display is:

```
NT 0100.0001
```

the Ethernet module is installed and is functional.

If a number between 0000.0002 and .7000 appears on that line, there is a failure in the Ethernet module. Call a service representative.

If NT 0000,7000 or any number above 7000 appears on that line, check all Ethernet connections, using the checklist in the following Troubleshooting Standard Ethernet section.

After successful completion of the power-up self-test and verification of the network, remove the loopback connector from the intermediary cable and store it for future diagnostic testing.

5. See the DECconnect documentation for more information on connecting your system to standard Ethernet.

Troubleshooting Standard Ethernet

If other data appears on the last line of information above the >>> prompt:

1. Make sure the intermediary cable is securely connected to the back of the system unit.
2. Make sure the loopback connector is securely connected to the intermediary cable.
3. Power up again.
4. After you have checked all Ethernet connections, to retest the Ethernet module, type the following command at the prompt:

```
>>>TEST 1 (or T 1)
```

5. If a connection has been established, the >>> prompt appears
6. If a connection is not established,

```
? 84 FAIL
```

appears.

If other data still appears on the last line of information on the power-up screen display, call your service representative.

After successful completion of the power-up self-test and verification of the network, remove the loopback connector from the intermediary cable and store it for future diagnostic testing.

After you have verified the network installation, see the DECconnect documentation for more information on connecting your system to standard Ethernet.

Appendix A

Associated Documents

Product availability and order numbers may vary with area. Please contact your local DIGITAL representative for ordering information.

Table A-1: Documentation

Document	Order Number
VAXstation 2000 System Guide	EK-V2000-SG
MicroVAX 2000 Hardware Installation Guide	EK-MVXAA-IG
MicroVAX 2000 Owner's Manual	EK-MVXAA-OM
VAXstation 2000/MicroVAX 2000 Maintenance Guide	EK-VSTAA-MG
VAXstation 2000/MicroVAX 2000 Technical Manual	EK-VTIAA-TM
DECconnect System General Description	EK-DECSY-GD
DECconnect System Requirements Evaluation Workbook	EK-DECSY-EG
DECconnect System Planning and Configuration Guide	EK-DECSY-CG
DECconnect System ThinWire Networks: Planning and Installation Guide	EK-DECSY-TG
Unshielded Twisted-Pair Ethernet Adapter Installation Guide	EK-TPEIG-IN
Unshielded Twisted-Pair Ethernet Wiring and Characterization Guide	EK-TPEWC-IN
VMS VAXcluster Manual	AA-LA27A-TE
DIGITAL ThinWire Ethernet Station Adapter (DESTA) Installation Card	EK-DESTA-IN
DIGITAL ThinWire Ethernet Station Adapter (DESTA) Technical Manual	EK-DESTA-TM
DIGITAL Ethernet ThinWire Multiport Repeater (DEMPR) Installation and User's Guide	EK-DEMPR-UG

Table A-1 (Cont.): Documentation

Document	Order Number
DIGITAL Ethernet ThinWire Multiport Repeater (DEMPR) Technical Manual	EK-DEMPR-TM
DESPR Installation/User's Guide	EK-DESPR-UG
DESPR Technical Manual	EK-DESPR-TM

Glossary

AWG

The abbreviation for American Wire Gauge.

barrel connector

A female connector for connecting two sections of ThinWire cable.

boot node

The management center for the cluster and its major resource provider.

bridge

An active network device used to join two Ethernet segments to create an extended LAN. The bridge is a specialized store-and-forward and packet-filtering station that synchronizes traffic between LANs and isolates local traffic.

coaxial cable

A 2-conductor, concentric, constant impedance transmission cable.

connector

A BNC-style connector that connects a section of ThinWire cable to a T-connector, to a system, or to a barrel connector.

DEBET

See bridge.

DECconnect

DIGITAL's simple, cost-effective cabling system for extending Ethernet and terminal interconnections into offices and work areas.

DECnet

DIGITAL networking software that runs on nodes in both local and wide-area networks.

DELNI

A local network interconnect product that provides eight separate network interfaces from a single transceiver tap.

DEMPE

A multiport repeater that provides eight ThinWire Ethernet drops from a single standard Ethernet connection.

DEQNA

The abbreviation for DIGITAL Equipment Q-bus Network Adapter. DEQNA connects MicroVAX and Q-bus-based PDP-11 systems to the Ethernet.

DESPR

A single port repeater that provides one ThinWire Ethernet drop from a single standard Ethernet connection.

DESTA

A station adapter that acts as a ThinWire Ethernet transceiver. A DESTA lets you connect a station with a transceiver cable to ThinWire Ethernet.

DEUNA

The abbreviation for DIGITAL Equipment UNIBUS Network Adapter. DEUNA connects VAX and UNIBUS-based PDP-11 systems to the Ethernet.

Ethernet

A type of local area network based on Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

ground

A voltage reference point in a system that has a zero voltage potential.

H4000

An H4000 is an Ethernet transceiver used to connect ThinWire Ethernet communications equipment to standard Ethernet. The H4000 supports a heartbeat signal used in network diagnostics.

H4000-BA

An H4000-BA is an Ethernet transceiver used to connect ThinWire Ethernet communications equipment to standard Ethernet. The H4000-BA does not support a heartbeat signal, because the heartbeat disrupts DELNI/DEMPE performance. See transceiver.

IEEE

Institute of Electrical and Electronics Engineers.

local area network (LAN)

A privately owned communication network whose speed is upward of 1M bits/s.

Local Area VAXcluster

Extends the current VAXcluster architecture to include MicroVAX 2000 and VAXstation 2000 in a VAXcluster environment. Local Area VAXclusters use ThinWire or standard Ethernet as the common interconnect.

multiport repeater

A repeater used to connect two or more cable segments.

multisegment LAN

A LAN composed of more than one cable segment.

network coordinator

The network coordinator manages the network, assigns unique node names and addresses for each station on the network, and provides administrative assistance to network users.

ohm

A unit of measurement, the unit of electrical resistance through which a potential difference of one volt will maintain a current of one ampere.

plenum

A compartment or chamber to which one or more compartments are connected in a building ventilation system, only for carrying environmental air.

polyvinyl chloride (PVC)

The standard coating used on cables. PVC is not UL-certified for installation in environmental airspace.

port

A socket or connector at the back of the computer to which a terminal, printer, or other communication devices are connected.

PVC

The standard coating used on cables. PVC is not UL-certified for installation in environmental airspace.

repeater

The interconnecting link between two Ethernet cable segments. The repeater lets you extend Ethernet networks beyond the limits imposed by a single

segment. Repeaters perform the basic actions of restoring signal amplitude, waveform, and timing amplitude to normal data and collision signals.

satellite equipment room (SER)

A room or wiring closet used as the central wiring hub for up to 64 drops.

satellite node

A node that is booted remotely from the system disk on the boot node.

section

A single length of ThinWire Ethernet cable terminated at each end with a connector.

segment

A length of cable made up of one or more cable sections connected with barrel connectors or T-connectors.

SER

See satellite equipment room.

single-segment LAN

A LAN that is composed of only one coaxial cable segment.

standard Ethernet

An IEEE standard 802.3 compliant Ethernet network composed of standard Ethernet cable as opposed to ThinWire Ethernet cable.

station

A single addressable device on a LAN, such as a VAXstation 2000, MicroVAX 2000, or any VAX.

station adapter

An active device used to connect stations that have transceiver connectors to ThinWire Ethernet cable. The DESTA is a station adapter.

T-connector

Connectors used to join ThinWire Ethernet cable sections. The connectors also attach to a station.

TCP/IP

Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocols that are standard with the ULTRIX-32 and ULTRIX-32w software.

teflon cable

A coating for cable that is UL-certified for installation in environmental airspace.

terminator

A connector used on one or both ends of an Ethernet segment that provides the 50-ohm termination resistance needed for the cable.

ThinWire

A DIGITAL trademark used to describe its 10base2 (IEEE standard 802.3 compliant) Ethernet products used for local distribution of data.

topology

The physical arrangement and relationship of interconnected nodes and lines in a network.

transceiver

A device that provides a single physical connection between standard Ethernet and Ethernet communication equipment.

unshielded twisted-pair cable

Multiple-conductor cable whose component cables are paired, twisted, and enclosed in a single jacket.

ULTRIX-32, ULTRIX-32w

DIGITAL implementations of native mode UNIX[®] software.

802.3

An IEEE standard describing the physical and data link layers of a local area network based on bus topology and Carrier Sense Multiple Access/Collision Detect (CSMA/CD).

Unix[®] is a registered trademark of the American Telephone & Telegraph Company.

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HOW TO ORDER

ADDITIONAL DOCUMENTATION

From	Call	Write
Alaska, Hawaii, or New Hampshire	603-884-6660	Digital Equipment Corporation P.O. Box CS2008 Nashua, NH 03061
Rest of U.S.A. and Puerto Rico*	800-258-1710	
* Prepaid orders from Puerto Rico must be placed with DIGITAL's local subsidiary (809-754-7575)		
Canada	800-257-5219 (for software documentation)	Digital Equipment of Canada Ltd. 100 Herzberg Road Kanata, Ontario, Canada K2K 2A6 Attn: Direct Order desk
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Workstations and MicroVAX 2000
Network Guide

EK-METAC-UG-003

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